REMARKS

Claims 11, 15-20, and 37-46 are pending in this application.

Claims 7-11, 15-20, and 37-46 are rejected.

The final office action dated January 7, 2009 indicates that claims 37-40, 7, 9, 11, 16-17, 19-20 and 41-45 are rejected under 35 USC 103(a) as being unpatentable over Kramer US Patent No. 6,466,539 in view of Fuchs U.S. Patent No. 5,923,830. Claims 37 and 41 are base claims. The '103 rejection is respectfully traversed.

Claim 37 recites a method of clearing latch-up and other single event functional interrupts in a data processing system having a plurality of nodes operatively connected to a serial data bus. Latch up refers to a monostable condition of a circuit, in which current continues in a self-sustaining manner. In certain environments, the latch-up is radiation-induced. In the system of figure 1, for example, the physical layer controller, or the link layer controller, or both, can experience latch-up.

Claim 37 recites a recovery command that disrupts the monostable condition and restores functionality. For example, the recovery command can cause a circuit experiencing latch-up to power down and then power back up. The recovery command can also clear up other single event functional interrupts (SEFI).

Kramer's system does not address latch up of a node. It follows that Kramer's system does not identify a node experiencing latch up, nor does it provide an approach for clearing latch-up without affecting other nodes in the system.

Kramer discloses a serial bus system having two data lines and a plurality of subscribers 14, 16, 18 and 20 connected to the bus system. The subscribers include a bus master 14 at one end of the line, a terminating module 16 at the other end of the line, and bus subscribers18 and 20 in-between. The bus master 14 and terminating module 16 send messages to each other, and the bus subscribers 18-20 check the

messages to see whether they are received within a fault tolerance time (col. 6, lines 34-48).

If a bus subscriber receives an erroneous status message or does not receive a status message within a certain time period, a fault is assumed (col. 6, lines 44-47). The fault is assumed in either a bus line or a subscriber (col. 6, lines 46-47). Any subscriber detecting a fault can cause the entire system to go into a safe state (col. 6, lines 48-52). The safe state is a standstill of the technical system, device, or machine by cutting off power.

The office action acknowledges that Kramer does not disclose a "recovery command" that causes a monostable condition to be disrupted, and also causes functionality of the node to be restored. However, there are other differences between Kramer and method claim 37:

1. Kramer doesn't identify a possible monostable condition in a node.
2. Kramer does not use an alternative bus path to disrupt the monostable condition. Kramer shuts down the entire system.
3. Kramer does not correct only the node experiencing latch-up. Kramer affects all nodes by shutting down the system.
4. Kramer does not provide an architecture that allows a node experiencing a monostable condition to clear its own latch-up. Kramer shuts down the entire system.

Unlike Kramer, Fuchs does address latch up of a node. However, Fuchs does not provide a logical jump from Kramer's system to the method of claim 37 or the system of claim 41.

Fuchs discloses a computer system that is supposed to tolerate and manage single event upsets in a computer having multiple processors (col. 9, lines 11-18). Each processor is connected to a power switch (col. 10, lines 11-18). A processor can be shut down by turning off its power switch.

The processors perform a voting operation to determine whether a processor has a fault. If the vote indicates a faulty processor, all processors are resynchronized (col. 11, lines 14-17). If the fault persists after resynchronization, a latch up is assumed (col. 11, lines 18-19). To remove the latch-up, the power switch of the faulty processor is turned off, thereby powering down the faulty processor (col. 11, lines 19-20). See also col. 15, lines 1-11.

As Fuchs notes, these steps are performed in a single computer (col. 11, lines 26-28). Fuchs discloses a second computer system, but only for backup (col. 9, lines 26-27).

Fuchs does not use an alternative bus path to disrupt a monostable condition in a processor, nor does Fuchs correct only the node experiencing latch-up. Resynchronization is performed to identify possible latch-up. Resynchronization affects all of the processors.

Fuchs does not provide an architecture that allows a node experiencing a monostable condition to clear its own latch-up. Fuchs uses an external power switch to shut down a processor.

Base claims 37 and 41 have been amended to clarify these distinctions. Claim 37 has been amended to recite that the recovery command is "transmitted via an alternative data bus path" and disrupts "a monostable condition in the second node and restore functionality of the second node without disrupting the first node and any other nodes of the plurality."

Thus, the combined teachings of Kramer and Fuchs do not produce a method having all of the features of claim 37 or a system having all of the features of claim 41. Therefore, base claims 37 and 41 and their dependent claims should be allowed over the documents made of record.

The claims should be allowed for the additional reason that the office action does not provide factual underpinnings or a clear articulation to establish obviousness. The office action alleges that the motivation of using Fuchs's teachings is to provide "circuit stability in hazardous environment". However, the office action offers no factual underpinnings to suggest that shutting off one of several processors in a computer would solve Kramer's problem, nor does offer evidence or a clear articulation of how the modifications to Kramer would achieve circuit stability. Kramer's subscribers appear to be industrial machinery. Kramer does not identify radiation-induced latch-up as a potential hazard. According to MPEP 2143, the "key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious." However, the office action does not provide factual underpinnings or a clear articulation. For this additional reason, the rejections of base claim 37 and 41 and their dependent claims should be withdrawn.

The office action does not establish prima facie obviousness of additional features recited in the dependent claims. For instance, Both Kramer and Fuchs are silent about latch-up in physical and link layers (claims 38-39 and 42-43). The office action alleges that Kramer's control modules 56, 58, 60 and 62 include link layer and physical layer controllers. However, Kramer is silent about the communication protocol and the components of the controllers. It is also silent about latch-up. Therefore, the allegation is unsubstantiated.

Since Kramer is silent about the components of the controllers 56-62, it follows that Kramer is also silent about dc-isolation of the physical layer controller from the link layer controller, and that disrupting a monostable condition in the link layer controller is independent of disrupting a monostable condition in the physical layer controller. This allows surgical correction of a latch-up, without having to power down an entire component.

Both Kramer and Fuchs are silent about detecting a surge which might indicate latch up (claims 10 and 15). Fuchs assumes that a processor is experiencing latch-up

if resynchronization fails. Kramer's system determines whether heartbeat messages are received, and shuts down the system if the messages are not received.

Finally, the office action does not address evidence of non-obviousness. In the previous response, a NASA Tech Brief entitled "Radiation-Tolerant Dual Data Bus" was made of record. The Tech Brief was published by NASA (at http://www.techbriefs.com/content/view/2079/34/1/0/). The Tech Brief describes work done by the applicant and recited in the claims

NASA Tech Briefs in general describe innovative approaches to problems that are of concern to NASA. They call attention to leading edge work within the NASA community. In this instance, the problem of concern to NASA is radiation-induced latch-up and other single-event upsets. In the opinion of the experts in the field, the claimed invention offers an innovative approach that enables "error-free operation of a data bus that includes ... components that are inherently susceptible to single-event upsets."

The Tech Brief suggests that the claimed invention is beyond the level of ordinary skill. Thus, the Tech Brief provides evidence of non-obviousness of base claims 37 and 41 and their dependent claims.

MPEP 2142 states

> When an applicant submits evidence, whether in the specification as originally filed or in reply to a rejection, the examiner must reconsider the patentability of the claimed invention. The decision on patentability must be made based upon consideration of all the evidence, including the evidence submitted by the examiner and the evidence submitted by the applicant. A decision to make or maintain a rejection in the face of all the evidence must show that it was based on the totality of the evidence.

The office action does not consider the NASA Tech Brief. The NASA Tech Brief must be considered.

The office action raises objections to claims 41 and 44 for containing typographical errors. These errors have been corrected in the section above. The examiner is thanked for pointing out the typographical errors.

The examiner is strongly encouraged to contact the undersigned to discuss any remaining issues before sending another office action.

Respectfully submitted,

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